



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/636,134	08/10/2000	Mehdi Balooch	IL-9940B	6671

7590

05/22/2002

L E Carnahan  
Agent  
P O Box 808 L 703  
Livermore, CA 94551

EXAMINER

BUEKER, RICHARD R

ART UNIT	PAPER NUMBER
----------	--------------

1763

12

DATE MAILED: 05/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/636,134

Applicant(s)

BALOOCH ET AL.

Examiner

Richard Bueker

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 19-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 1763

Claim 26 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not provide any enabling disclosure for laser ablation of a target containing a material having a work function of approximately 1 eV, wherein the target is composed of barium metal oxide. Also, the recitation of "alkali metal oxide" appears to be incorrect. The specification at page 2, lines 1-7 states that it is well known that alkali metal oxides show low work functions, and refers to the book by Fomenko for this fact. It is noted, however, that the tables of low work function materials listed in this book (made of record by applicants in paper no. 7) does not generally include alkali metal compounds, but instead lists alkaline earth metal compounds. See page 432 of Keenan (General College Chemistry) attached to this office action regarding the difference between alkali metal elements and alkaline earth elements. Applicants should correct their specification and claim 26 to make clear that they intended to refer to alkaline earth oxides rather than alkali metal oxides.

Applicant is advised that should claim 20 be found allowable, claim 22 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claims 19-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russo (5,432,151) taken in view of Moto (5,672,210) and Cotell (5,242,706). Russo discloses a conventional laser ablation apparatus wherein a vacuum chamber is provided with a window for directing an excimer laser to a target in the vacuum chamber, and suggests (col. 6, lines 65-68) means for heating and cooling the substrate. Russo (col. 5, line 61) suggests using an alkaline earth oxide (magnesium oxide) as the target material in his laser ablation apparatus. Magnesium oxide is listed in the tables of Fomenko as having a low work function in the range of approximately 1 eV as presently claimed. Russo does not discuss rotating or tilting the substrate. Moto, however, discloses a laser ablation apparatus of the same type taught by Russo, and Moto teaches that it is desirable to provide means to rotate the substrate (col. 5, lines 40-54 and Fig. 5), and that it is desirable to provide means to tilt the substrate (col. 5, lines 25-39 and Figs. 1 and 5). It would have been obvious to one skilled in the art to provide the substrate holder of Russo with means to rotate and tilt the substrate, because Moto teaches that substrate rotation provides a more uniform coating and tilting provides the apparatus with processing versatility. Russo also provides an ion beam for his apparatus which has an inherent capability of being used to process the surface of a substrate as presently claimed. Also, Cotell teaches the use of an ion beam in a laser ablation apparatus for the purpose of processing the surface of a substrate by cleaning the surface. It would have been obvious to one skilled in the art to ion beam clean the surface of a substrate in Russo's apparatus because Cotell teaches that a clean surface will improve adhesion of a deposited film.

Art Unit: 1763

Claims 19-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references cited above, taken in further view of Gartner I (5,866,975) or Face (5,389,606) or Koga (5,897,790) or Mehrotra (6,007,399), each of whom discloses a step of depositing a layer by laser ablation of a target containing a low work function material of approximately 1 eV. It would have been obvious to use such a target in the conventional laser ablation apparatus of the type described by Russo and Moto.

Gartner I teaches (col. 6, lines 59-61) that it is desirable to use an excimer (ultraviolet) laser for deposition of low work function coatings. It would have been prima facie obvious to use a conventional laser ablation apparatus of the type described by Russo and Moto to deposit the coatings of Gartner I.

Face teaches (see col. 6, lines 58-64) the step of depositing BaO, CaO and CuO which are all included on the list of low work function materials by Fomenko et al. Face teaches that these materials are deposited from a target by laser ablation or sputtering. Face states that "(t)ypically, the sources of involatile oxides are targets that contain those oxides". At col. 7, lines 29-31, Face teaches that his targets contain BaO, CaO and CuO. It is noted that the limitation of claim 19, lines 1-2 of "apparatus for depositing a material having a low work function" is a recitation of intended use that does not so limit the present apparatus claims. Thus, while the apparatus claims are limited by the recitation of a particular target composition, the claims are not limited by referring to the properties of a coating intended to be formed in the apparatus. Face teaches a target containing BaO and CaO, which are low work function materials, and thus makes

Art Unit: 1763

obvious the use of such a target in the apparatus of Russo, even though Face does not teach forming low work function coatings.

Mehrotra discloses barium metal oxide coatings deposited by laser ablation, (col. 3, lines 30-51), which is recited in applicants' claim 26. It is well known in the laser ablation art that a target must contain the material that is deposited. Therefore, it would have been obvious to use a target containing the barium metal oxide materials which correspond to the coatings desired by Mehrotra. It also would have been obvious to use such a target in the conventional laser ablation apparatus disclosed by Russo.

Koga teaches (col. 21, lines 12-17) the use of a laser ablation target containing silicon, diamond, DLC or ZrC, which are materials that are well known in the art to have a work function of approximately 1 eV. It would have been obvious to deposit the low work function coatings taught by Koga in a conventional laser ablation apparatus such as disclosed by Russo and Moto.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (703) 308-1895. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Art Unit: 1763

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

*Richard Bueker*  
Richard Bueker  
Primary Examiner  
Art Unit 1763

May 20, 2002